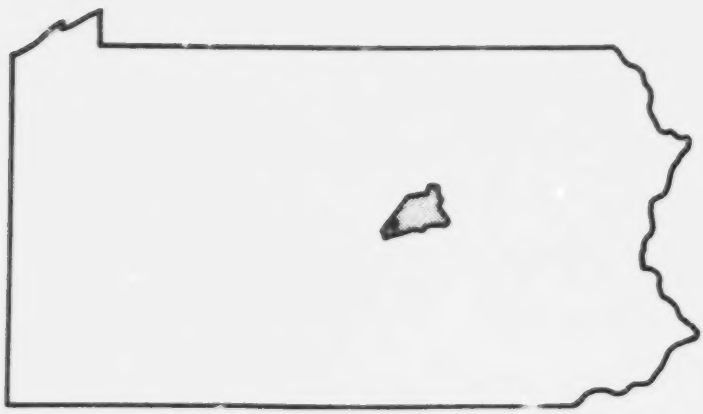
FLOOD INSURANCE STUDY

TOWNSHIP OF HARTLEY, PENNSYLVANIA
UNION COUNTY



MARCH 4, 1988

Federal Emergency Management Agency

COMMUNITY NUMBER - 422102

NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance study purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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FLOOD INSURANCE STUDY
TOWNSHIP OF HARTLEY, UNION COUNTY, PENNSYLVANIA

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the Township of Hartley, Union County, Pennsylvania, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in its efforts to promote sound floodplain management. Minimum floodplain management requirements for participation in the National Flood Insurance Program (NFIP) are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, floodplain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for this study were prepared by the U. S. Geological Survey (USGS) for the Federal Emergency Management Agency (FEMA), under Inter-Agency Agreement No. EMW-85-E-1823, Project Order No. 8. This work was completed in August 1986.

1.3 Coordination

On November 28, 1984, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the township, and the USGS (the study contractor) to identify the streams to be studied by detailed methods. On April 22, 1987, a final CCO meeting was held with representatives of FEMA, the township, and the study contractor to review the results of the study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the incorporated area of the Township of Hartley, Union County, Pennsylvania. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods: Penns Creek, for its entire length within the community; and Laurel Run, from its confluence with Penns Creek to a point approximately 3.8 miles upstream of State Route 235. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through August 1991.

The following streams were studied by approximate methods: Spruce Run, White Deer Creek, Cherry Run, Weikert Run, and portions of Laurel Run and Buffalo Creek. Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and the Township of Hartley.

2.2 Community Description

The Township of Hartley is located in the western part of Union County in central Pennsylvania. It is bordered by the Township of Lewis and the Borough of Hartleton to the east; the Townships of Adams, Spring, and West Beaver to the south; the Township of Armagh to the southwest; and the Townships of Haines and Miles to the northwest.

2.3 Principal Flood Problems

Major floods cause localized inundation of structures along Penns Creek and Laurel Run.

2.4 Flood Protection Measures

There are no flood protection measures located within the Township of Hartley. Two levees exist along Penns Creek near Weikert. FEMA specifies that all levees must have a minimum of 3 foot freeboard against 100-year flooding to be considered a safe flood protection structure. These levees offer no flood protection.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the community, standard hydrologic and hydraulic study methods were used to determine the flood

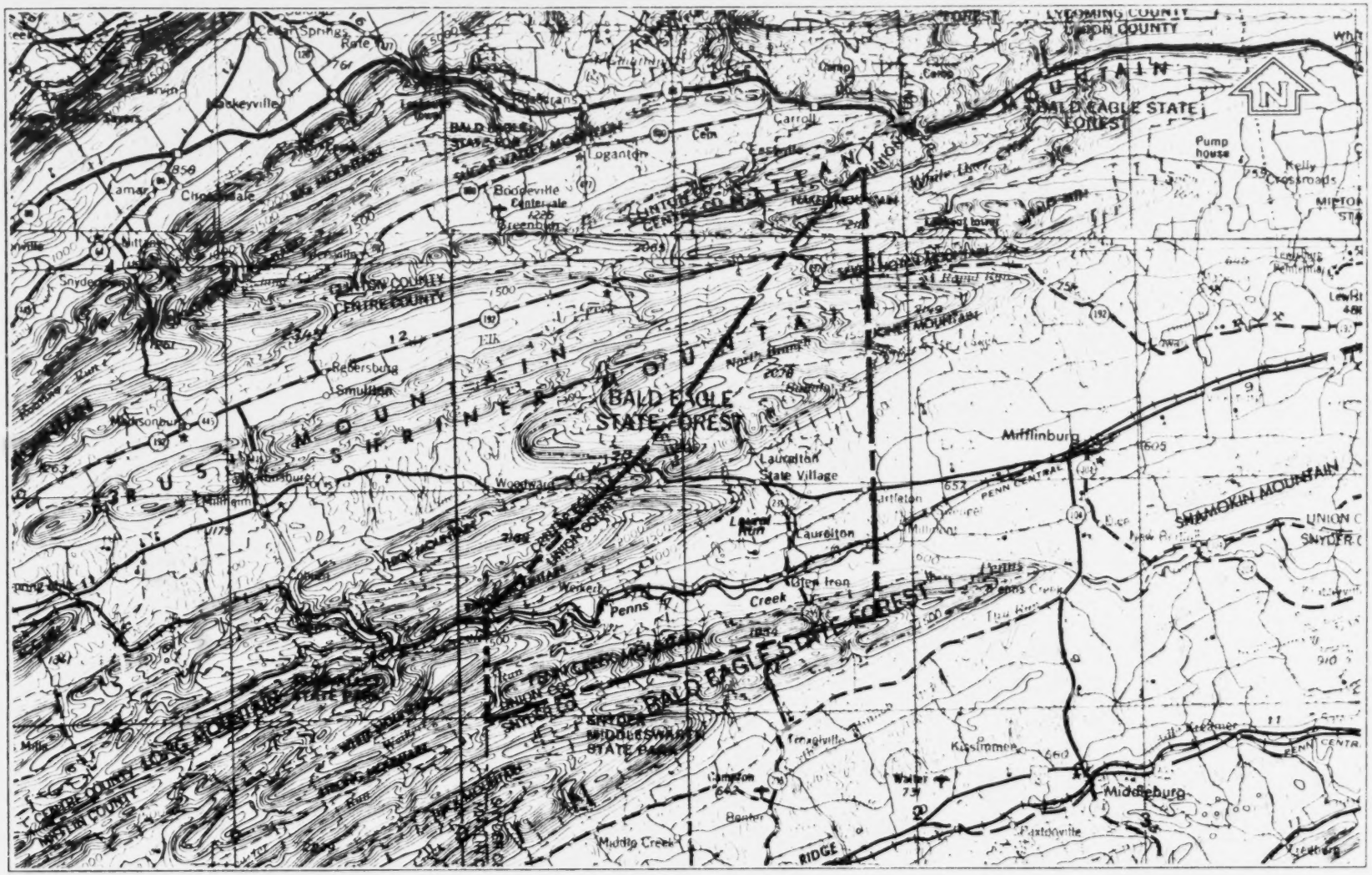


FIGURE 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

APPROXIMATE SCALE

4 0 4 8 12 MILES

VICINITY MAP

hazard data required for this study. A flood event of a magnitude which is expected to be equaled or exceeded once on the average during any 100-year period (recurrence interval) has been selected as having special significance for floodplain management and for flood insurance rates. This event, commonly termed the 100-year flood, has a 1 percent chance of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the community.

The flood-frequency discharge values for the gage on Penns Creek were determined by USGS Bulletin 17B and the Flood Insurance Study for the Township of Jackson (References 1 and 2). The values were adjusted for the smaller drainage areas in the Township of Hartley.

The flood-frequency discharge values for Laurel Run were determined utilizing regional regression equations developed in USGS Water Resources Investigations 82-21 for Region 5E (Reference 3).

A summary of the drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges."

3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross sections were field surveyed and located at close intervals above and below bridges and culverts to compute the significant backwater effects of these structures. All bridges, dams, and culverts in the community were field surveyed to obtain elevation data and structural geometry.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGE (cfs) 100-YEAR
PENNS CREEK		
At downstream corporate limits	282	25,400
Above confluence of Laurel Run	260	23,800
Above confluence of Henstep Run	247	22,900
Above confluence of Weikert Run	222	21,000
At cross section AC (stream distance 61,924 feet)	216	20,600
LAUREL RUN		
At confluence with Penns Creek	20.1	3,400
Above Legislative Route 59003	13.2	2,500
At State Route 235	10.9	2,170

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1) and the Flood Insurance Rate Map (Exhibit 2) where applicable.

Water-surface elevations of floods of the selected recurrence intervals for Penns Creek from the downstream corporate limits to a point approximately 11.7 miles upstream were determined from WSPRO, a step-backwater program (References 4 and 5). Normal depths of flooding were used to estimate the 100-year recurrence interval elevations for: Penns Creek, from approximately 11.7 miles upstream of the downstream corporate limits to the upstream corporate limits; and Laurel Run, from its confluence with Penns Creek to a point approximately 13,616 feet upstream. The 100-year recurrence interval elevations were estimated from the regional relationship between drainage area and flood depth (Reference 6). This relationship was developed by the USGS by means of regional regression analyses of basin areas and 100-year within-channel depths observed at stream gages. Depths were adjusted on the basis of hydraulic calculations to account for increased depth due to backwater from hydraulic structures, such as bridges and culverts (References 4 and 5). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals.

Channel roughness factors (Manning's "n") used in the hydraulic computations were assigned on the basis of engineering judgment and field inspection of the floodplain areas. The roughness coefficients for the channel range from 0.032 to 0.048 and for the overbank areas from 0.047 to 0.075.

The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps; the descriptions of the marks are presented in Elevation Reference Marks (Exhibit 3).

4.0 FLOODPLAIN MANAGEMENT APPLICATIONS

The NFIP encourages State and local governments to adopt sound floodplain management programs. Therefore, each Flood Insurance Study provides 100-year flood elevations and delineations of the 100-year floodplain boundaries to assist communities in developing floodplain management measures.

4.1 Floodplain Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for floodplain management purposes. For the streams studied in detail, the 100-year floodplain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps at a scale of 1:24,000 with a contour interval of 20 feet (Reference 7).

For the streams studied by approximate methods, the floodplain boundaries were delineated using the Flood Hazard Boundary Map for the Township of Hartley (Reference 8).

The 100-year floodplain boundaries are shown on the Flood Insurance Rate Map (Exhibit 2). On this map, the 100-year floodplain boundary corresponds to the boundary of the areas of special flood hazards (Zones A and AE). Small areas within the floodplain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

4.2 Floodways

Encroachment on floodplains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of floodplain management involves balancing the economic gain from floodplain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of floodplain management. Under this concept, the area of the 100-year floodplain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent floodplain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced.

The area between the floodway and 100-year floodplain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the floodplain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to floodplain development are shown in Figure 2.

No floodways were calculated as part of this study.

5.0 INSURANCE APPLICATION

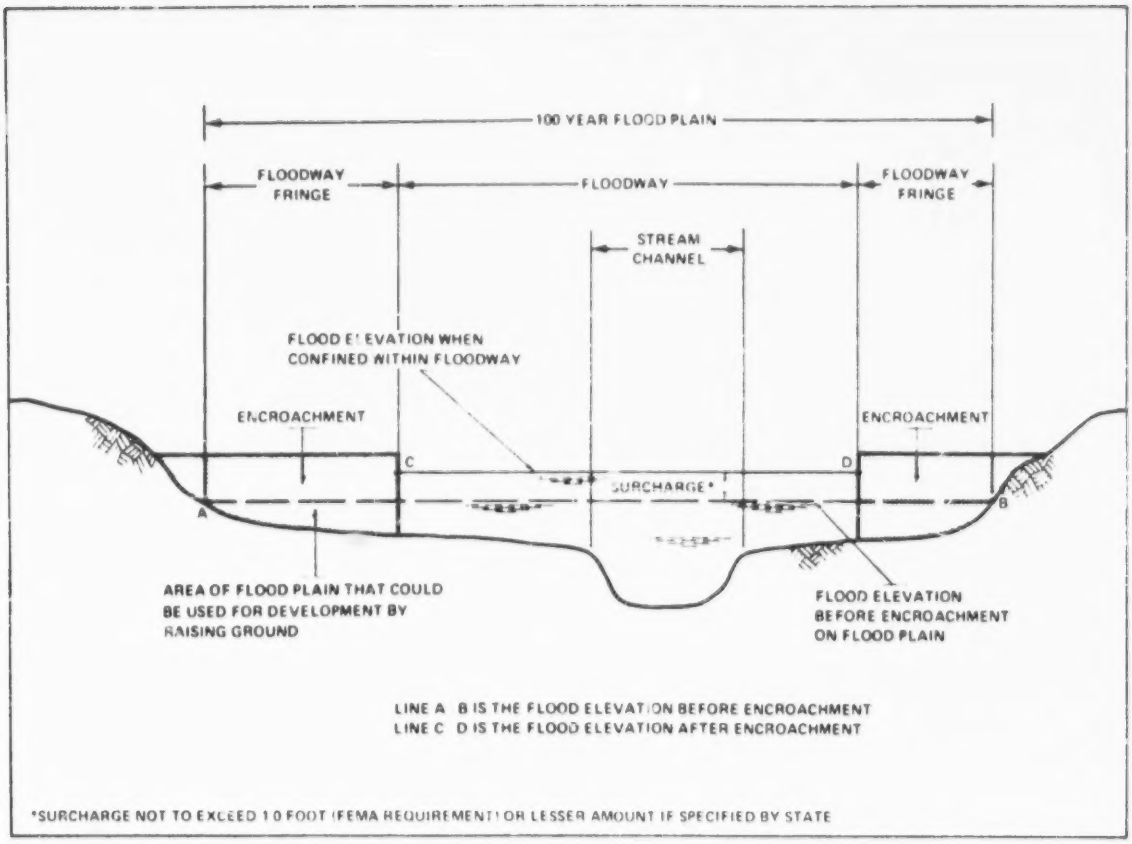
For flood insurance rating purposes, flood insurance zone designations are assigned to a community based on the results of the engineering analyses. These zones are as follows:

Zone A

Zone A is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by approximate methods. Because detailed hydraulic analyses are not performed for such areas, no base flood elevations or depths are shown within this zone.

Zone AE

Zone AE is the flood insurance rate zone that corresponds to the 100-year floodplains that are determined in the Flood Insurance Study by detailed methods. In most instances, whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.


100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE

FLOODWAY SCHEMATIC Figure 2

Zone AH

Zone AH is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually areas of ponding) where average depths are between 1 and 3 feet. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone AO

Zone AO is the flood insurance rate zone that corresponds to the areas of 100-year shallow flooding (usually sheet flow on sloping terrain) where average depths are between 1 and 3 feet. Average whole-foot depths derived from the detailed hydraulic analyses are shown within this zone.

Zone A99

Zone A99 is the flood insurance rate zone that corresponds to areas of the 100-year floodplain that will be protected by a Federal flood protection system where construction has reached specified statutory milestones. No base flood elevations or depths are shown within this zone.

Zone V

Zone V is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Because approximate hydraulic analyses are performed for such areas, no base flood elevations are shown within this zone.

Zone VE

Zone VE is the flood insurance rate zone that corresponds to the 100-year coastal floodplains that have additional hazards associated with storm waves. Whole-foot base flood elevations derived from the detailed hydraulic analyses are shown at selected intervals within this zone.

Zone X

Zone X is the flood insurance rate zone that corresponds to areas outside the 500-year floodplain, areas within the 500-year floodplain, and to areas of 100-year flooding where average depths are less than 1 foot, areas of 100-year flooding where the contributing drainage area is less than 1 square mile, and areas protected from the 100-year flood by levees. No base flood elevations or depths are shown within this zone.

Zone D

Zone D is the flood insurance rate zone that corresponds to unstudied areas where flood hazards are undetermined, but possible.

6.0 FLOOD INSURANCE RATE MAP

The Flood Insurance Rate Map is designed for flood insurance and floodplain management applications.

For flood insurance applications, the map designates flood insurance rate zones as described in Section 5.0 and, in the 100-year floodplains that were studied by detailed methods, shows selected whole-foot base flood elevations or average depths. Insurance agents use the zones and base flood elevations in conjunction with information on structures and their contents to assign premium rates for flood insurance policies.

For floodplain management applications, the map shows by tints, screens, and symbols, the 100-year floodplain. The locations of selected cross sections used in the hydraulic analyses are shown where applicable.

7.0 OTHER STUDIES

Flood Insurance Studies for the Townships of Miles, Haines, West Beaver, and Adams have been prepared (References 9, 10, 11, and 12). The results of this study are in exact agreement with results of those studies.

Flood Insurance Studies for the Townships of Spring and Lewis are currently being prepared (References 13 and 14). The results of those studies will be in exact agreement with the results of this study.

Due to its more detailed nature, this study supersedes the Flood Hazard Boundary Map for the Township of Hartley (Reference 8).

8.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Liberty Square Building (Second Floor), 105 South Seventh Street, Philadelphia, Pennsylvania 19106.

9.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of the Interior, Geological Survey, Office of Water Data Collection, Interagency Advisory Committee on Water Data, "Guidelines for Determining Flood Flow Frequency," Bulletin 17B, Reston, Virginia, Revised September 1981.

2. Federal Emergency Management Agency, Flood Insurance Study, Township of Jackson, Snyder County, Pennsylvania, Washington, D. C., January 20, 1982.

3. U. S. Department of the Interior, Geological Survey, Water Resources Investigations 82-21, Evaluation of the Streamflow-Data Program in Pennsylvania by H. N. Flippo, Jr., Washington, D. C., 1982.

4. U. S. Federal Highway Administration, Report FWHA/RD-86/108, Bridge Waterways Analysis Model/ Research Report by J. O. Shearman, W. H. Kirby, V. R. Schneider, and H. N. Flippo, Jr., Washington, D. C., 1986.

5. National Technical Information Service, Bridge Waterways Analysis Model/ User's Instructions by J. O. Shearman, W. H. Kirby, and V. R. Schneider, Springfield, Virginia, 1985.

6. U. S. Department of the Interior, Geological Survey, Water-Resources Investigations 86-4195, Technique for Estimating Depths of 100-Year Floods in Pennsylvania by H. N. Flippo, Jr., Washington, D. C., 1986.

7. U. S. Department of the Interior, Geological Survey, 7.5-Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 20 Feet: Beavertown, Pennsylvania, 1965, Photorevised 1973; Hartleton, Pennsylvania, 1965, Photorevised 1973; Woodward, Pennsylvania, 1968, Photorevised 1973; Weikert, Pennsylvania, 1968, Photorevised 1973; Carroll, Pennsylvania, 1965, Photorevised 1973.

8. Federal Emergency Management Agency, Federal Insurance Administration, Flood Hazard Boundary Map, Township of Hartley, Union County, Pennsylvania, November 7, 1980.

9. Federal Emergency Management Agency, Flood Insurance Study, Township of Miles, Centre County, Pennsylvania, Washington, D. C., December 4, 1985.

10. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Township of Haines, Centre County, Pennsylvania, Washington, D. C., August 1, 1978.

11. Federal Emergency Management Agency, Flood Insurance Study, Township of West Beaver, Snyder County, Pennsylvania, Washington, D. C., September 24, 1984.

12. Federal Emergency Management Agency, Flood Insurance Study, Township of Adams, Snyder County, Pennsylvania, Washington, D. C., January 3, 1986.

13. Federal Emergency Management Agency, Flood Insurance Study, Township of Spring, Snyder County, Pennsylvania (Unpublished).

14. Federal Emergency Management Agency, Flood Insurance Study, Township of Lewis, Union County, Pennsylvania (Unpublished).

EXHIBIT 3 - ELEVATION REFERENCE MARKS

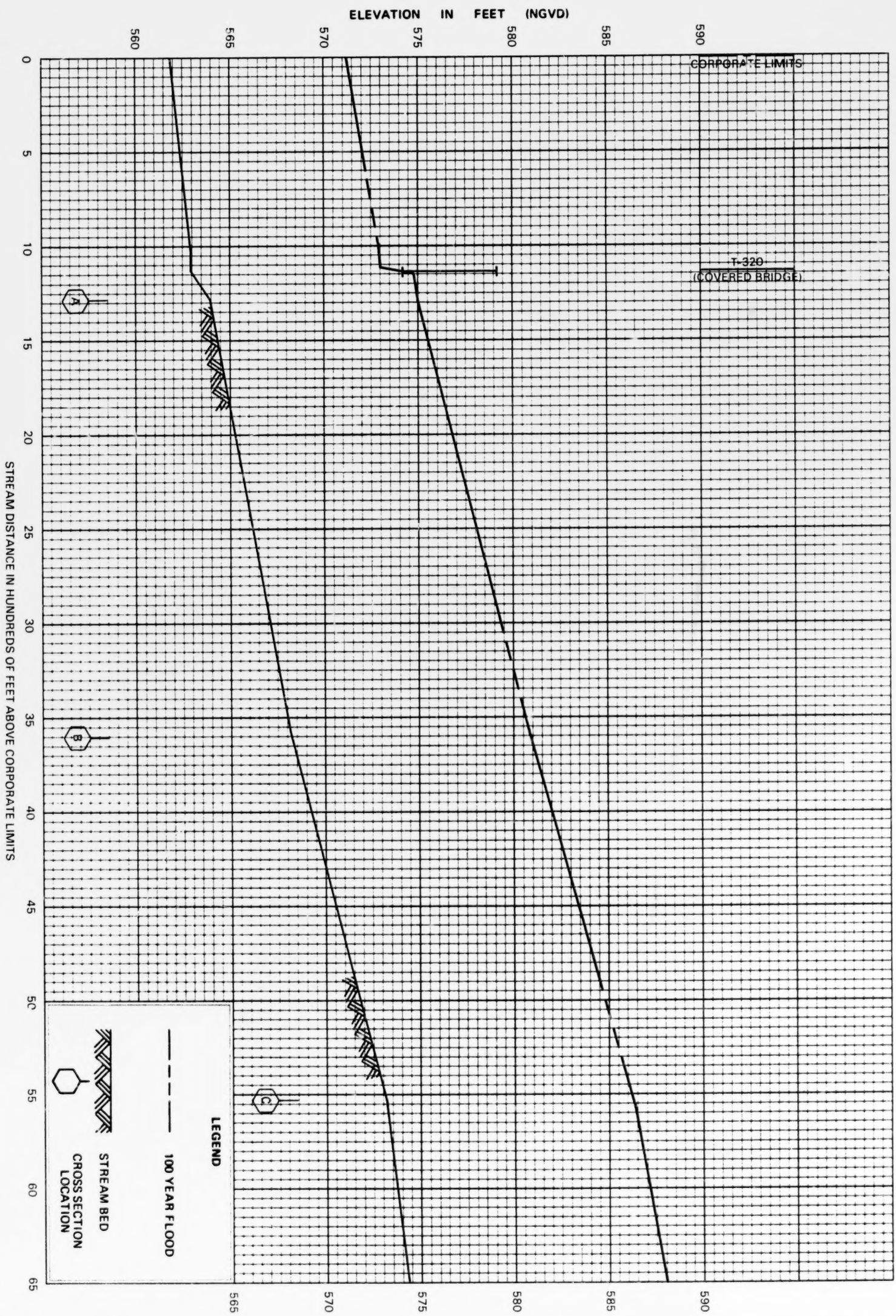
Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 1	20	899.41	USGS standard disk, stamped TT 33 K 1930, set in top of concrete post, 30 feet south of abandoned railroad, 10 feet west of jeep trail, and approximately 550 feet east of Winter's Road bridge (Legislative Route 59001) over Cherry Run.
RM 2	20	829.10	Top of chiseled circle, on top of stone facing at downstream end of culvert on Winter's Road, 3,900 feet east of intersection of Cherry Run. Painted yellow.
RM 3	20	865.94	USC&GS standard disk, stamped F 38 1934, set in top of concrete post, 100 feet west of railroad crossing on Winter's Road, 20 feet south of railroad, and approximately same elevation as track bed.
RM 4	20	799.22	Top edge of bottom identification plate N 24747 on pole No. 11948 N 24747, beside grey-shingled house, on north bank of Penns Creek, 0.5 mile south of Winter's Road and 1.6 miles southwest of Weikert, Pennsylvania.
RM 5	20	791.39	Top edge of bottom identification plate N 24818 on pole No. 1253 N 24818 30, on north bank of Penns Creek, 7,000 feet by stream above bridge at Weikert, Pennsylvania.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 6	20	738.14	Hacksawed square on north end of steel girder on upstream side of bridge over Penns Creek at Weikert. Painted orange.
RM 7	20	691.27	Top of southeast corner of concrete headwall of culvert under railroad bed on unnamed tributary to Penns Creek, 10 feet south of iron gate across railroad, at Pardee, Pennsylvania.
RM 8	25	657.63	USC&GS standard disk, stamped H 38 1934, set in south end of east abutment of railroad bridge over unnamed tributary to Penns Creek, approximately 550 feet east of road crossing.
RM 9	25	613.53	Top of ground rod beside power pole, 200 feet east of yellow house, 25 feet south of outhouse, near end of cul-de-sac, and approximately 0.7 mile west of Glen Iron, Pennsylvania. Painted yellow.
RM 10	25	609.66	USC&GS standard disk, stamped J 39 1934, set in top of concrete post, 210 feet west of State Route 235 crossing, 50 feet north of railroad grade, and approximately 2.5 feet lower than railroad grade, in Glen Iron, Pennsylvania.

EXHIBIT 3 - ELEVATION REFERENCE MARKS - continued

Reference Mark	FIRM Panel	Elevation (Feet NGVD)	Description of Location
RM 11	25	614.46	PDH tablet set in top of concrete rail, 22 feet from south end of bridge, on State Route 235 bridge, on downstream side, over Penns Creek at Glen Iron, Pennsylvania.
RM 12	25	601.73	Chiseled circle on top of southwest downstream wing wall on Legislative Route 59002 bridge over Laurel Run, 1.0 mile southeast of Laurelton, Pennsylvania.
RM 13	25	643.83	PDH tablet, stamped USGS 11 N 1963, on bridge over unnamed tributary to Laurel Run, 1,200 feet south of Laurelton, Pennsylvania.
RM 14	25	694.45	South, top corner of L-shaped culvert headwall, on upstream side, 30 feet east of intersection of State Route 235 and Legislative Route 59003, 2,700 feet north of Laurelton, Pennsylvania.
RM 15	25	583.90	Top of upstream end of metal culvert pipe, 1,850 feet east of intersection of Legislative Routes 59002 and 59005, and 20 feet west of farm lane.
RM 16	25	581.38	Chiseled square on north downstream wing wall of covered bridge on road T-320 over Penns Creek, 1,200 feet upstream of lower corporate limits. Painted yellow.



FEDERAL EMERGENCY MANAGEMENT AGENCY

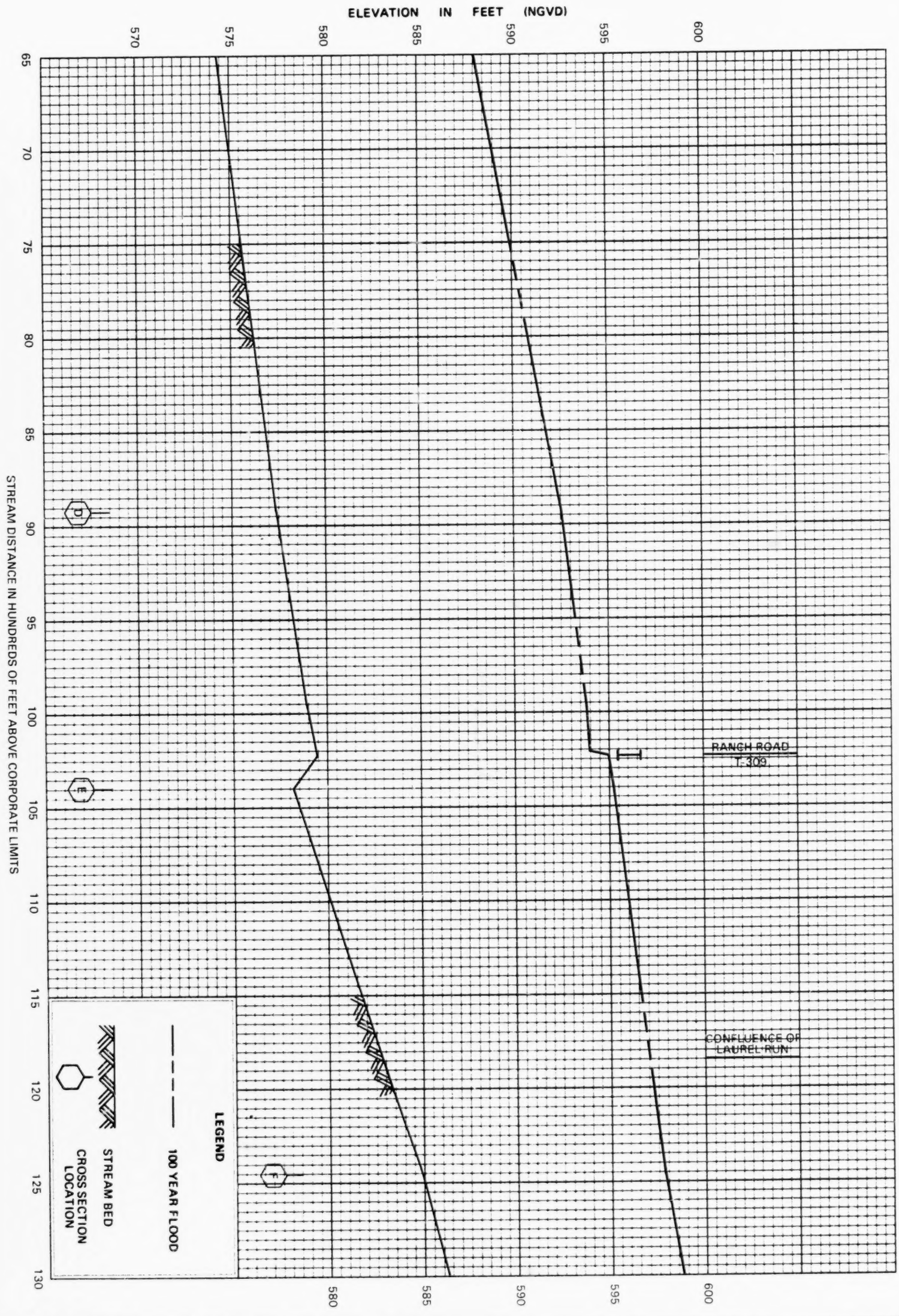
TOWNSHIP OF HARTLEY, PA

(UNION CO.)

FLOOD PROFILES

PENNS CREEK

01P



FEDERAL EMERGENCY MANAGEMENT AGENCY

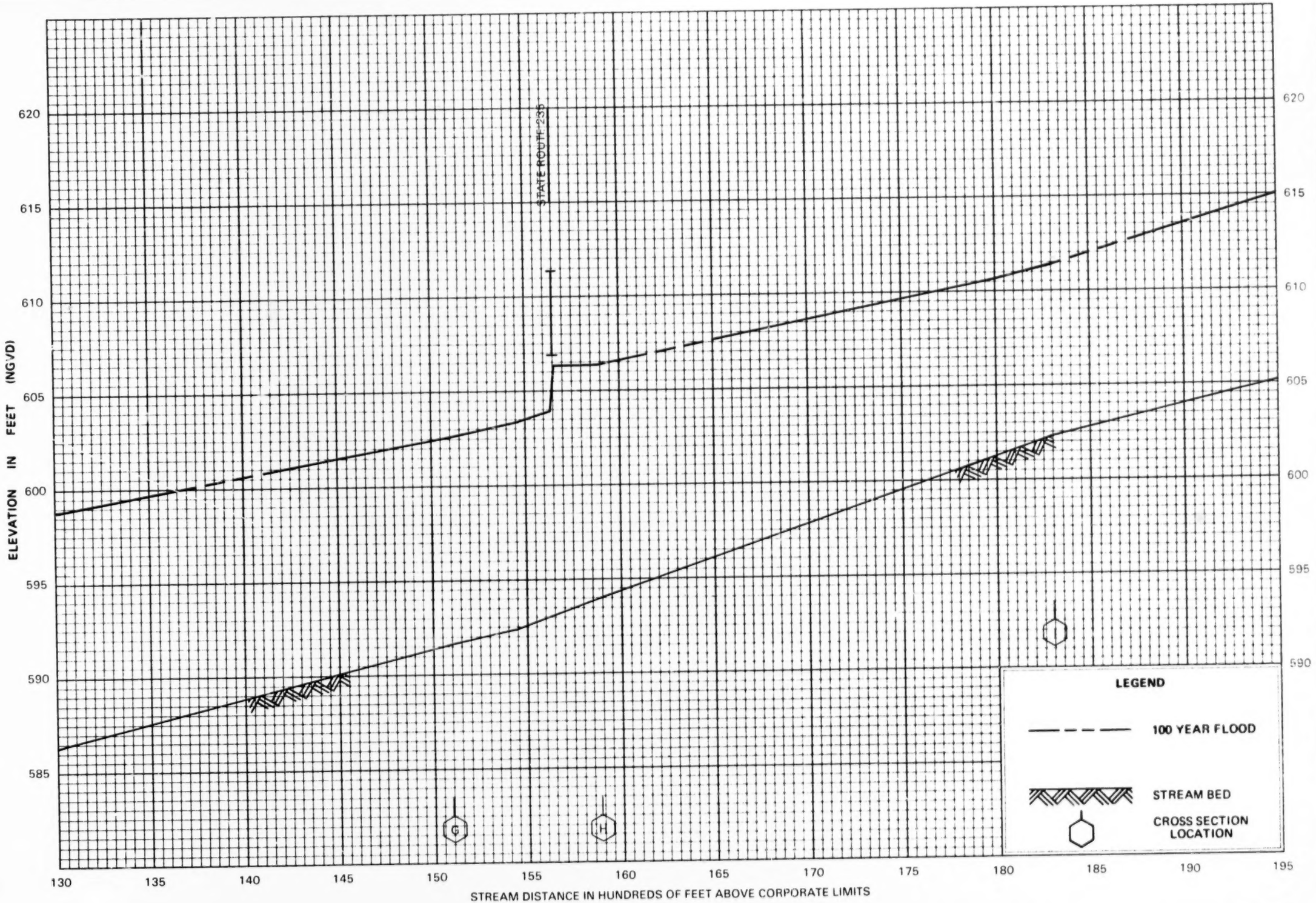
TOWNSHIP OF HARTLEY, PA

(UNION CO.)

FLOOD PROFILES

PENNS CREEK

02P



FLOOD PROFILES

PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

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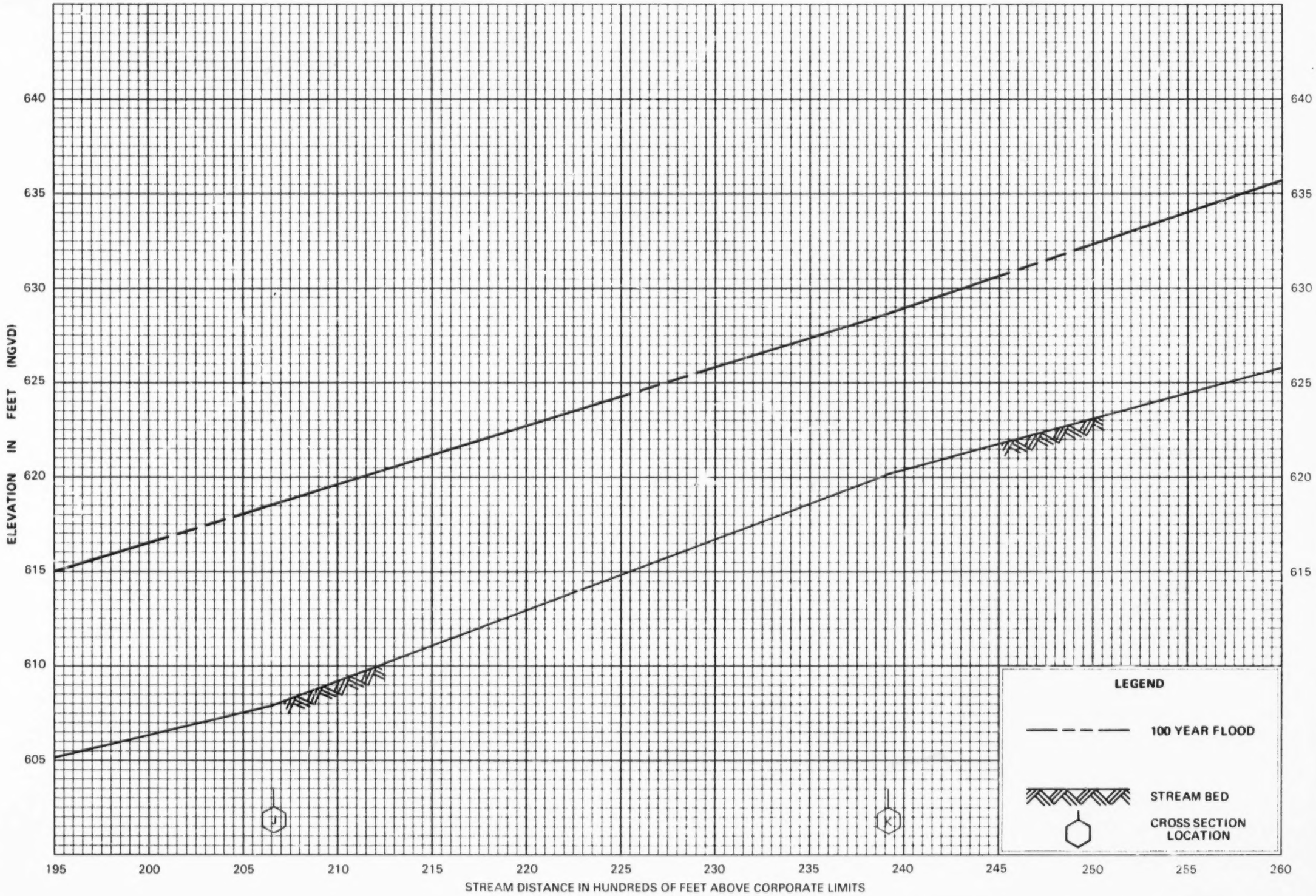


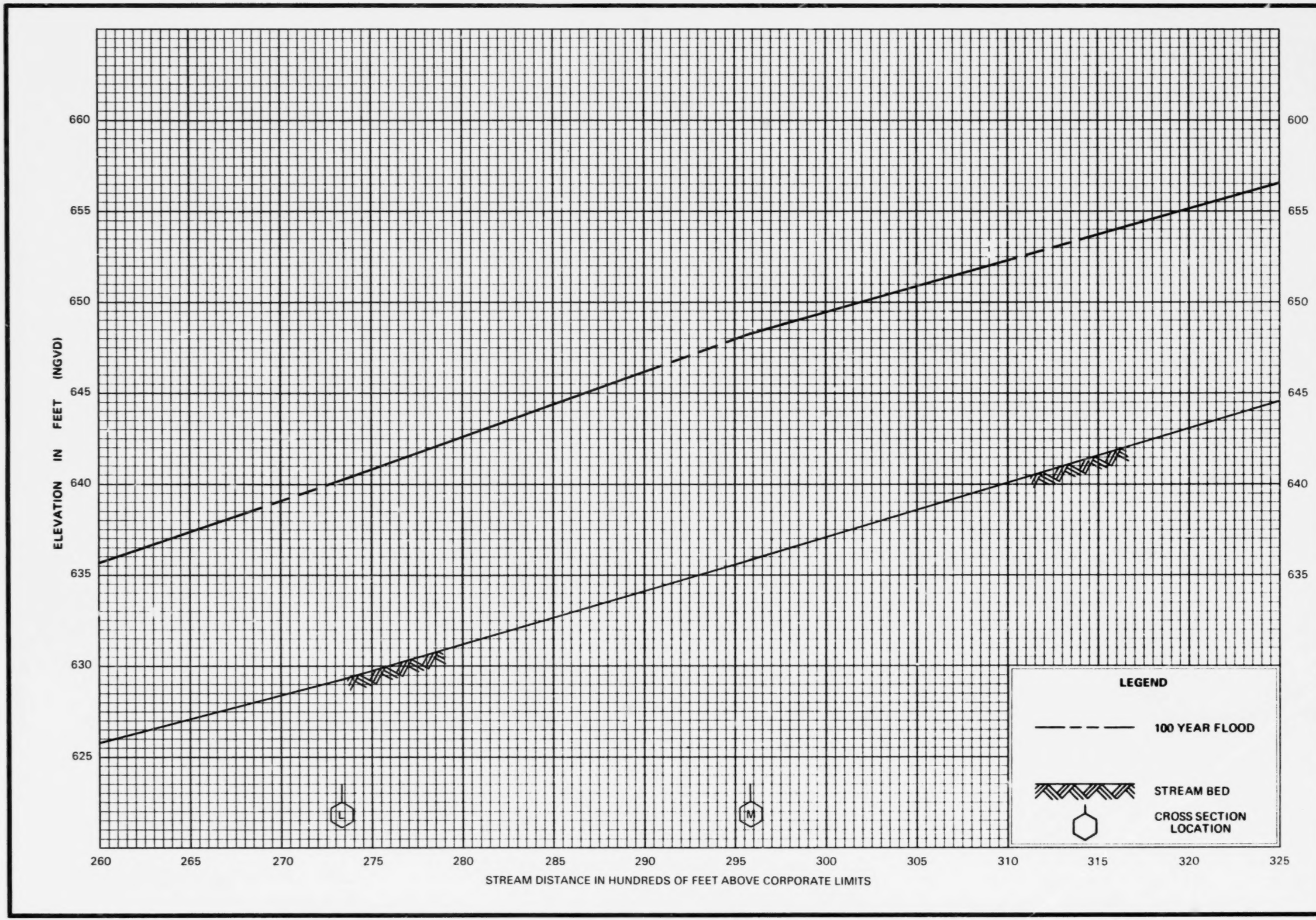
FLOOD PROFILES

PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA
(UNION CO.)

04P



FLOOD PROFILES

PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

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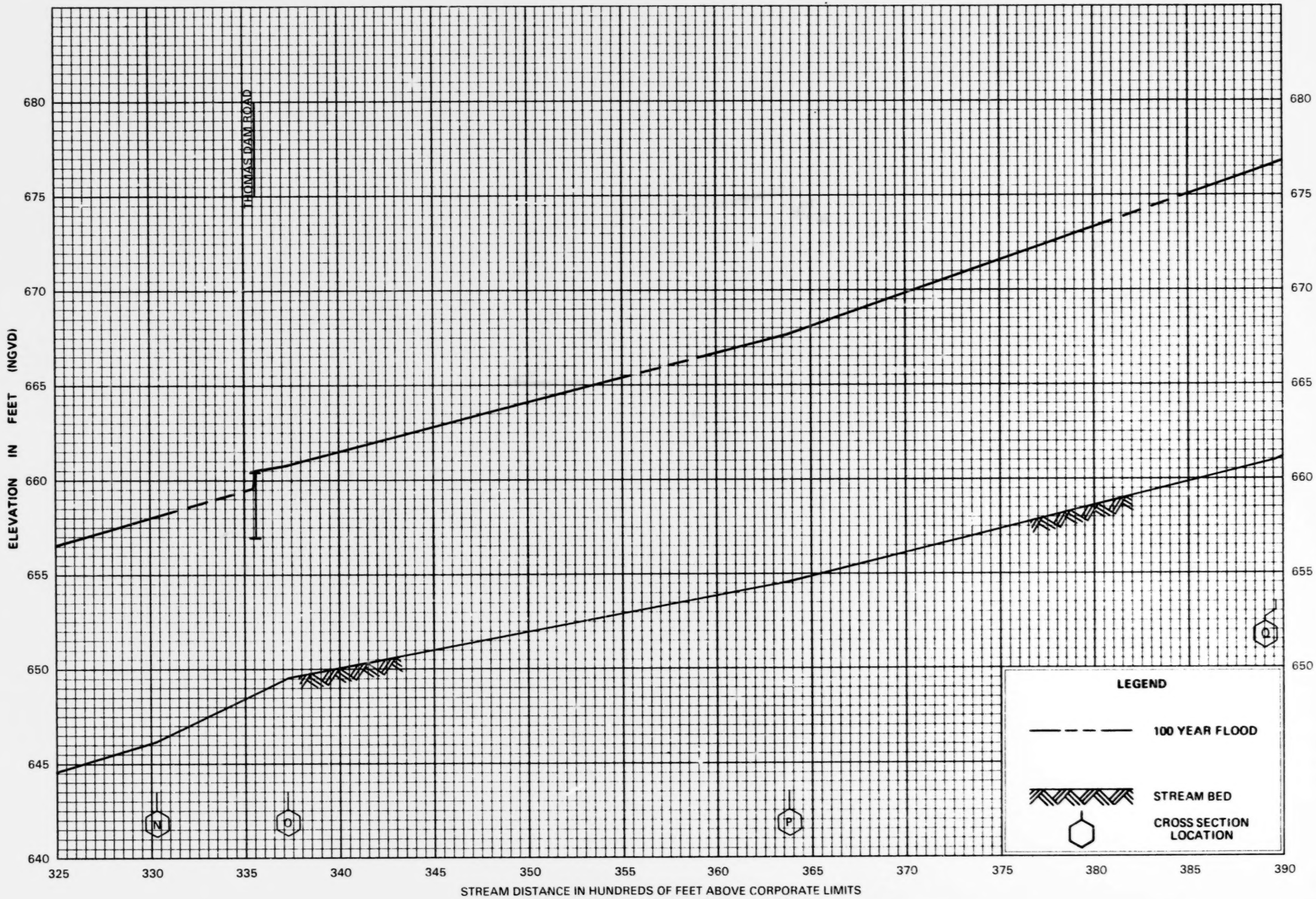

FLOOD PROFILES

PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

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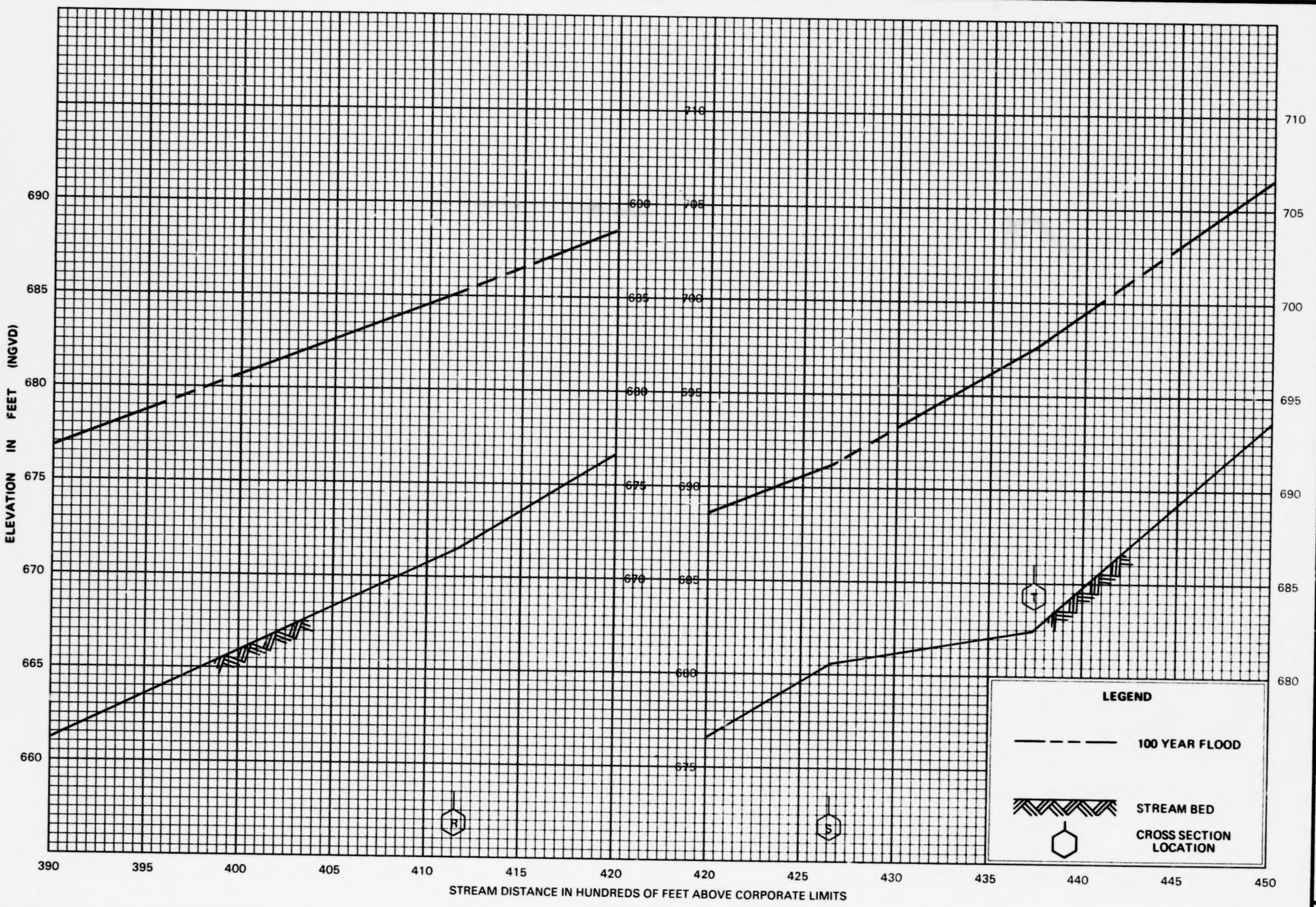


FLOOD PROFILES

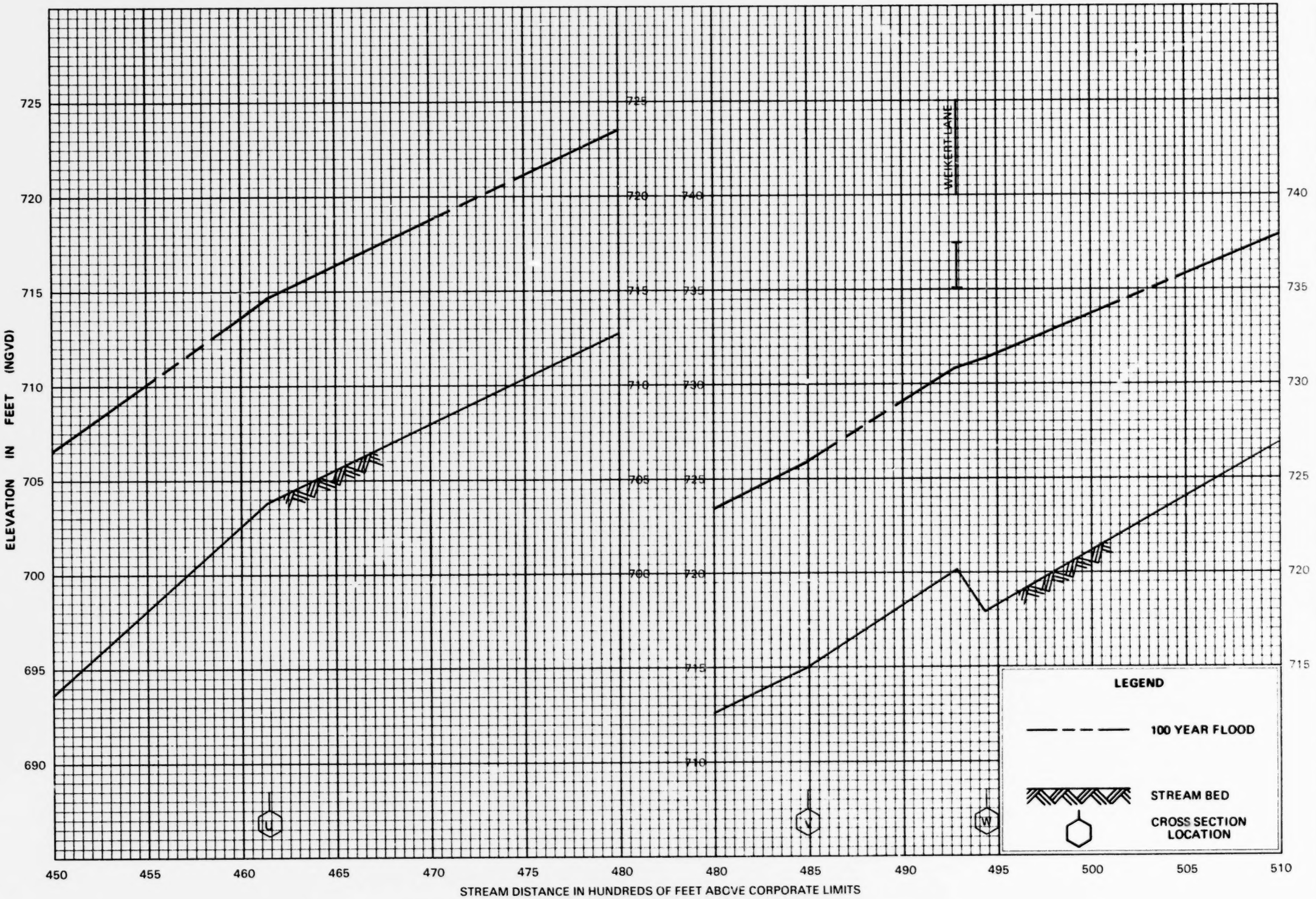
PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

07P



FLOOD PROFILES

PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

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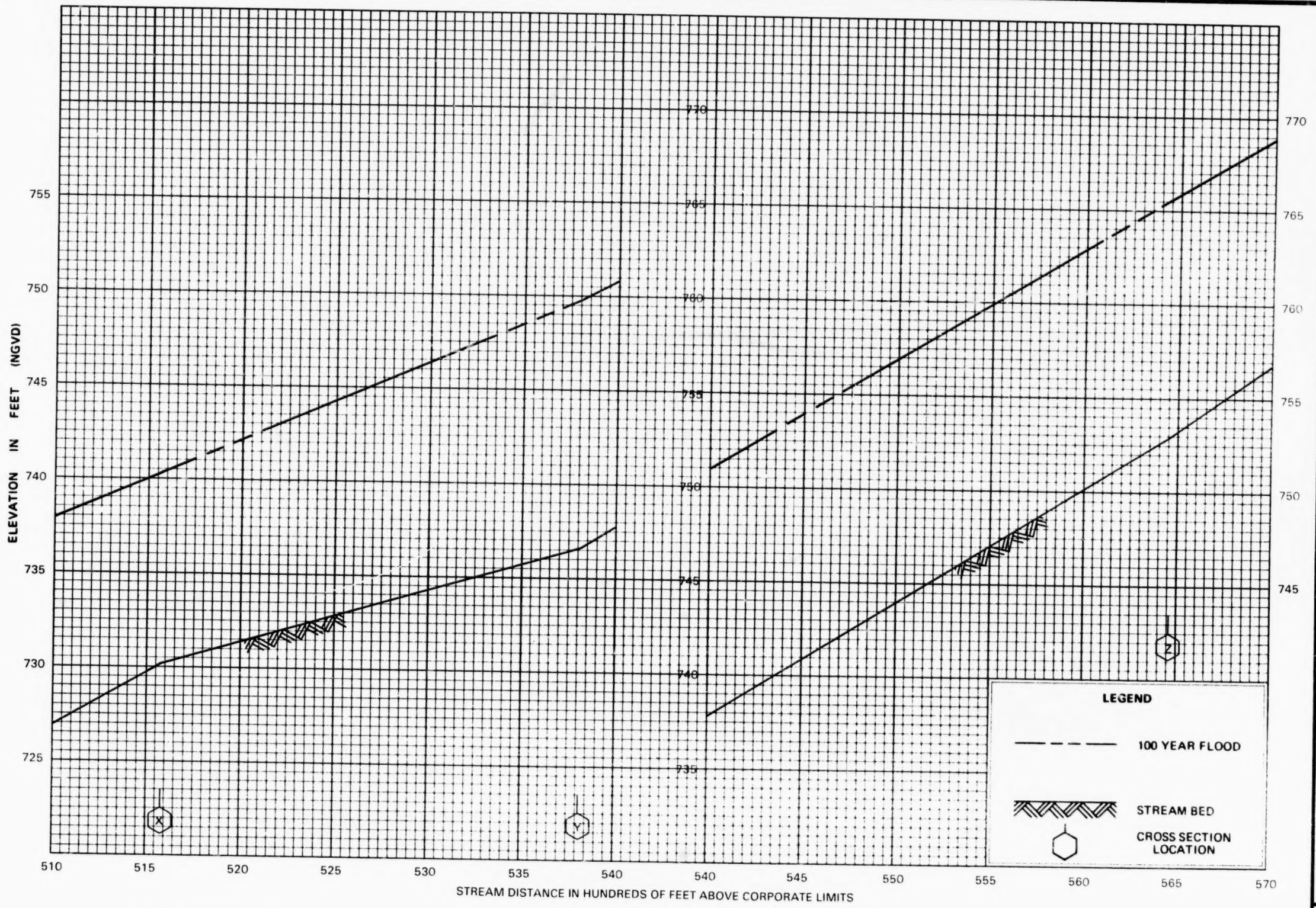


FLOOD PROFILES

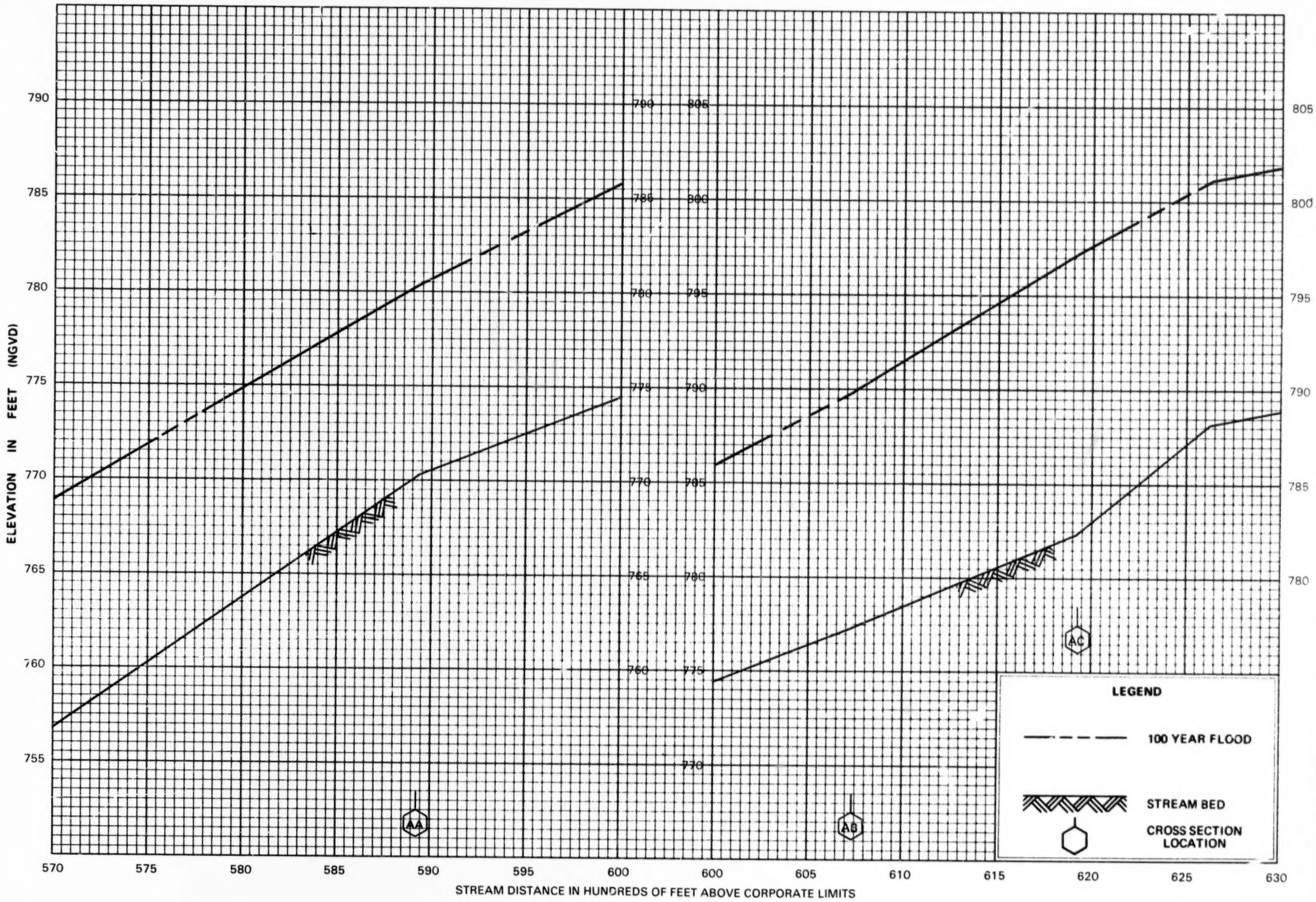
PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

09P



FLOOD PROFILES

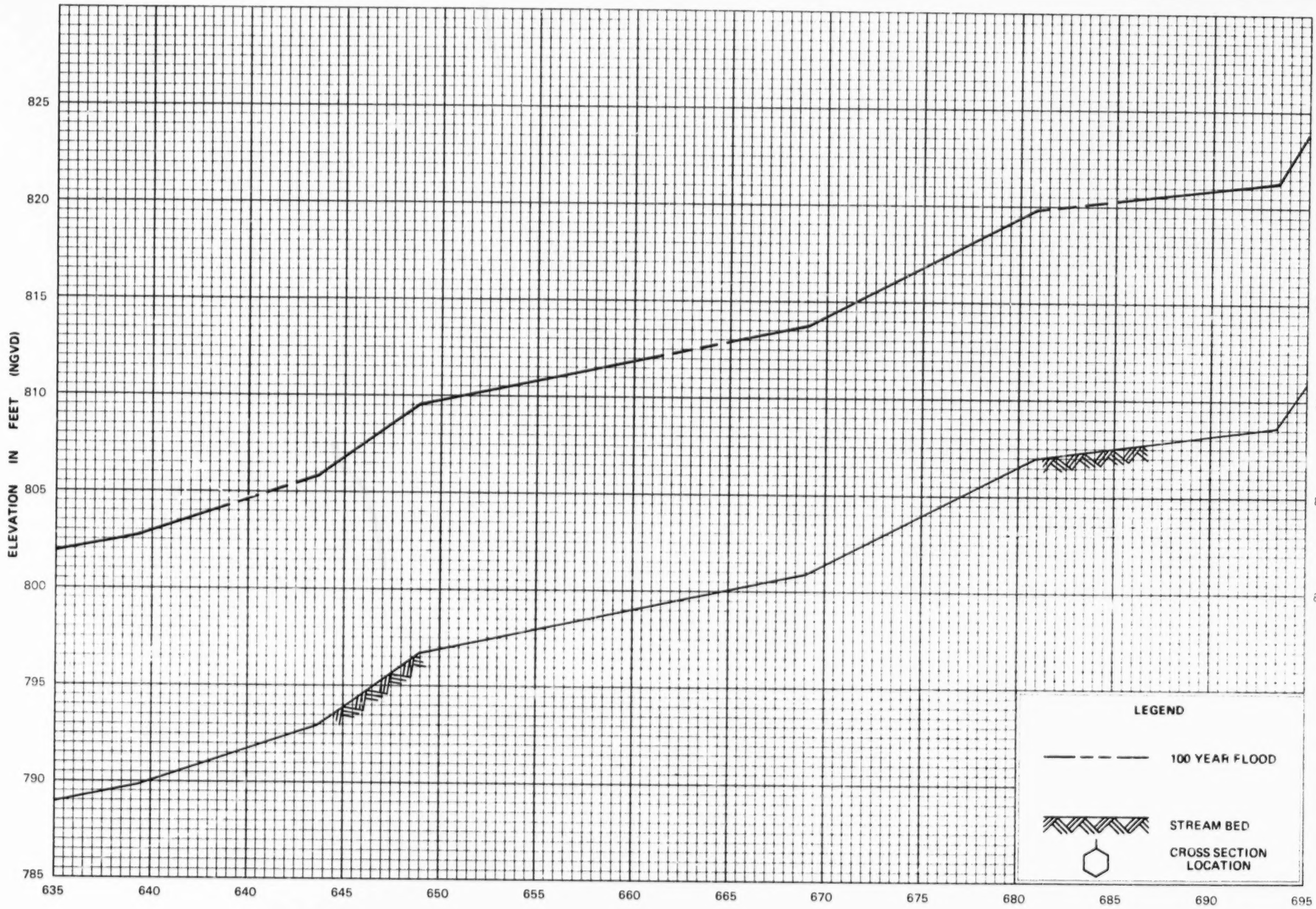
PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

10P



FLOOD PROFILES

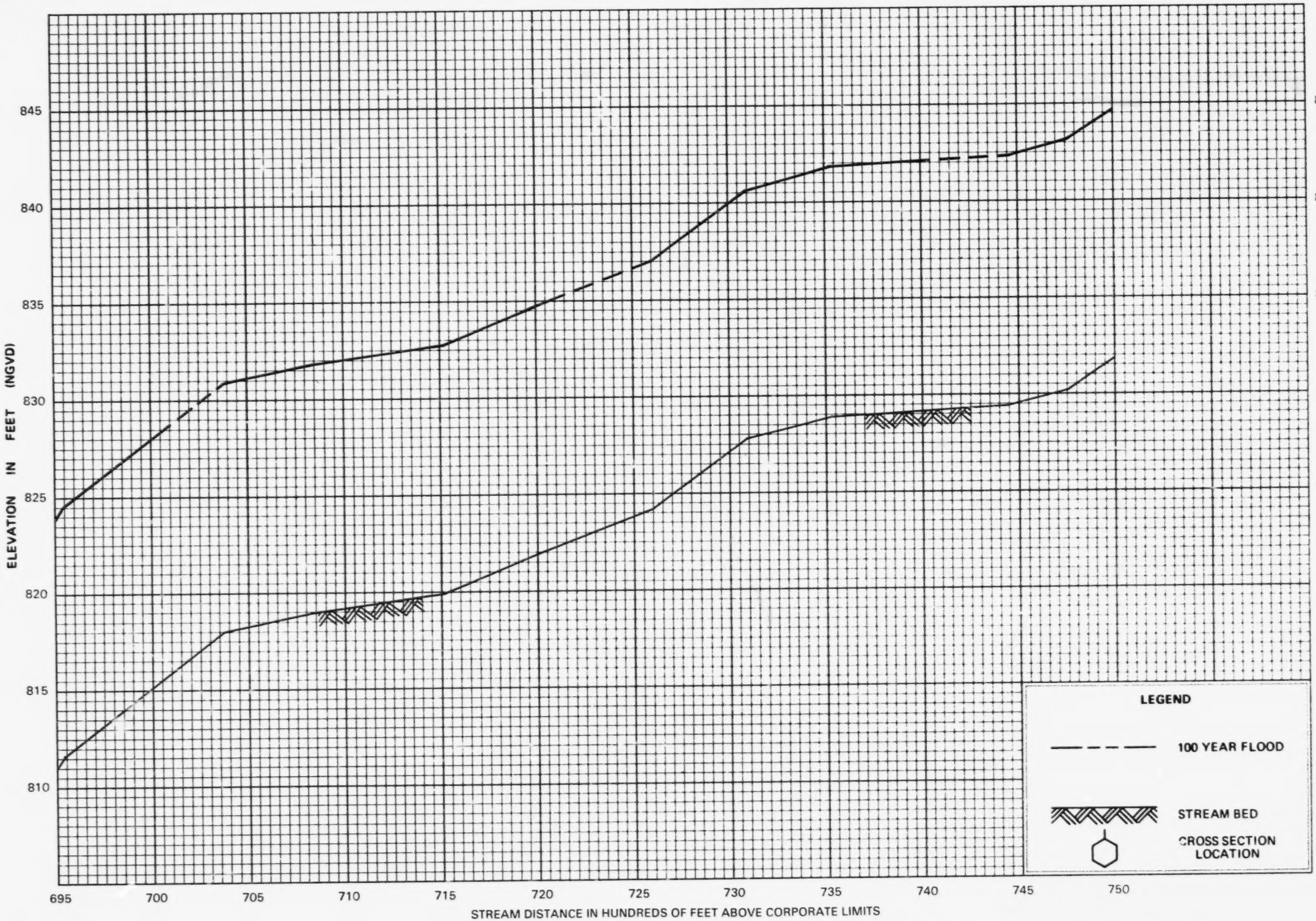
PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

11P



FLOOD PROFILES

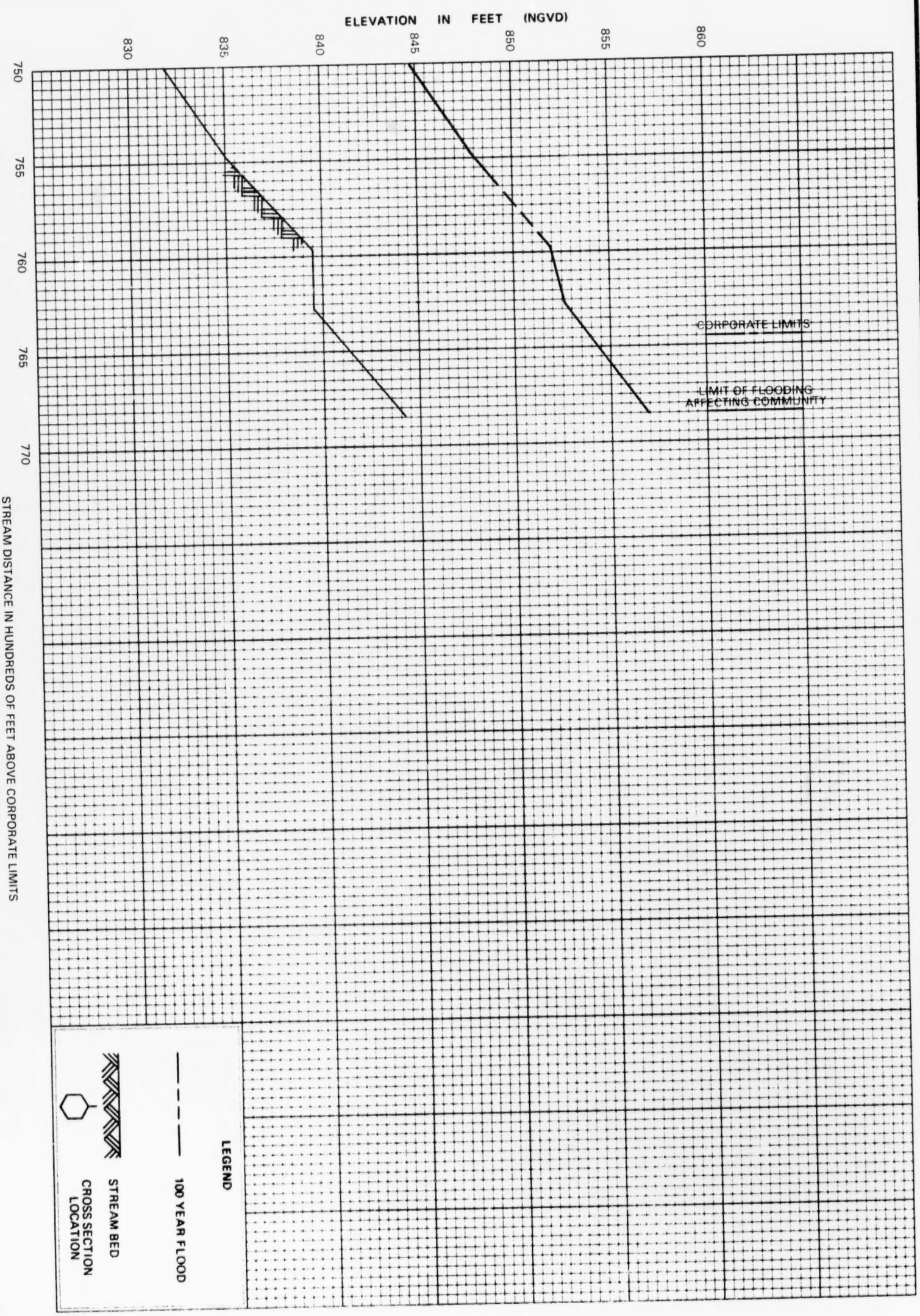
PENNS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

12P



13P

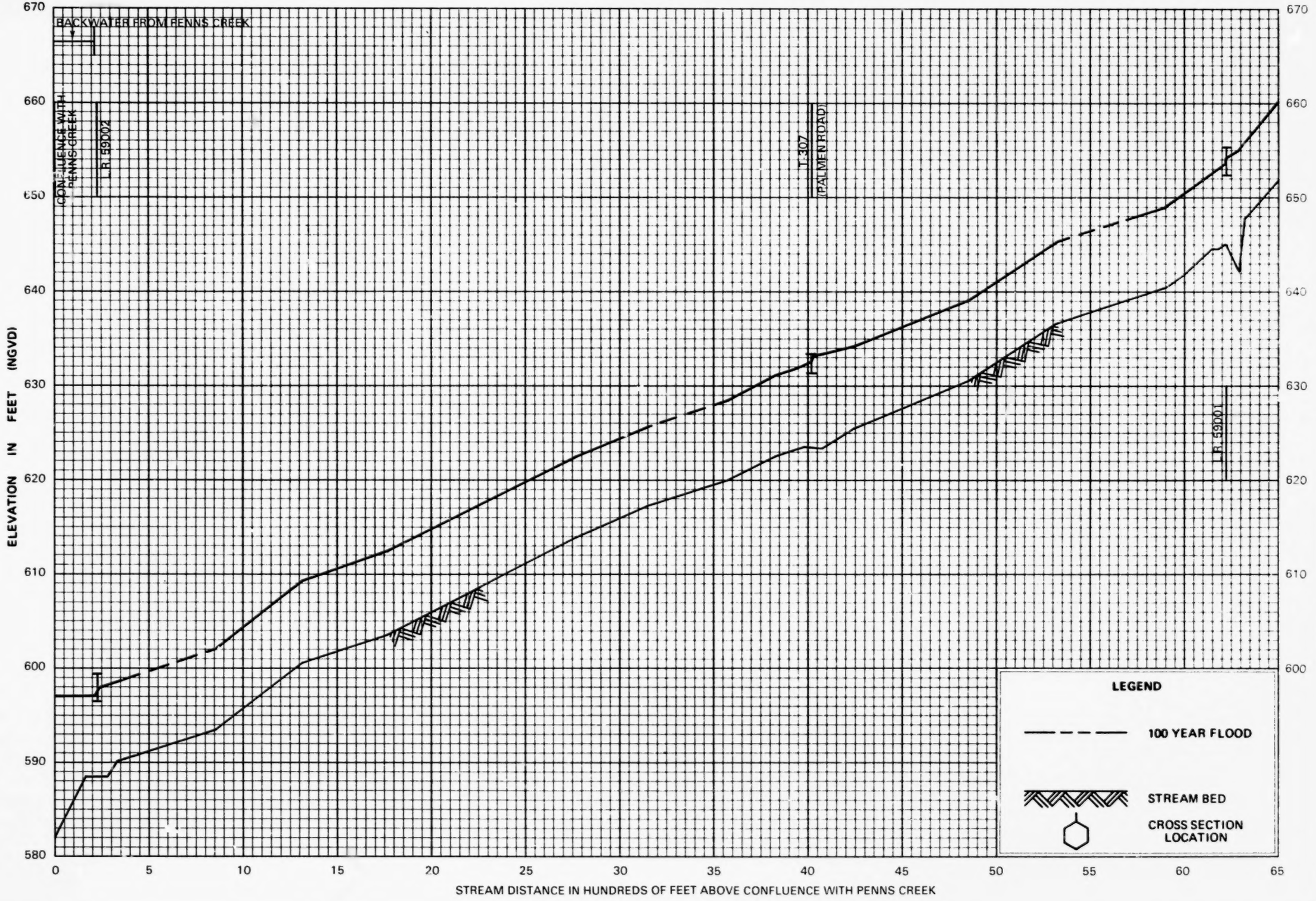
FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

FLOOD PROFILES

PENNS CREEK



FLOOD PROFILES

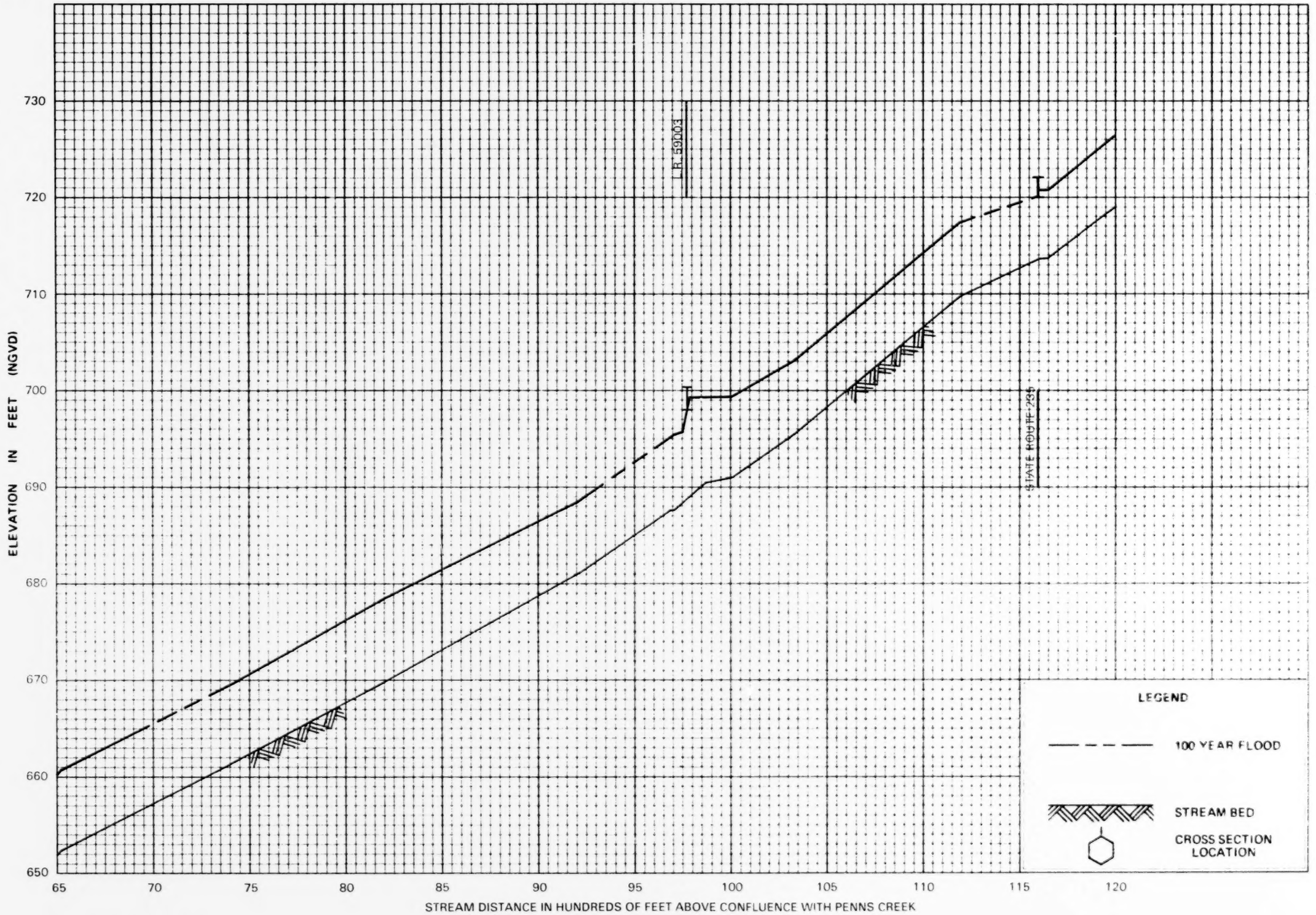
LAUREL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

14P



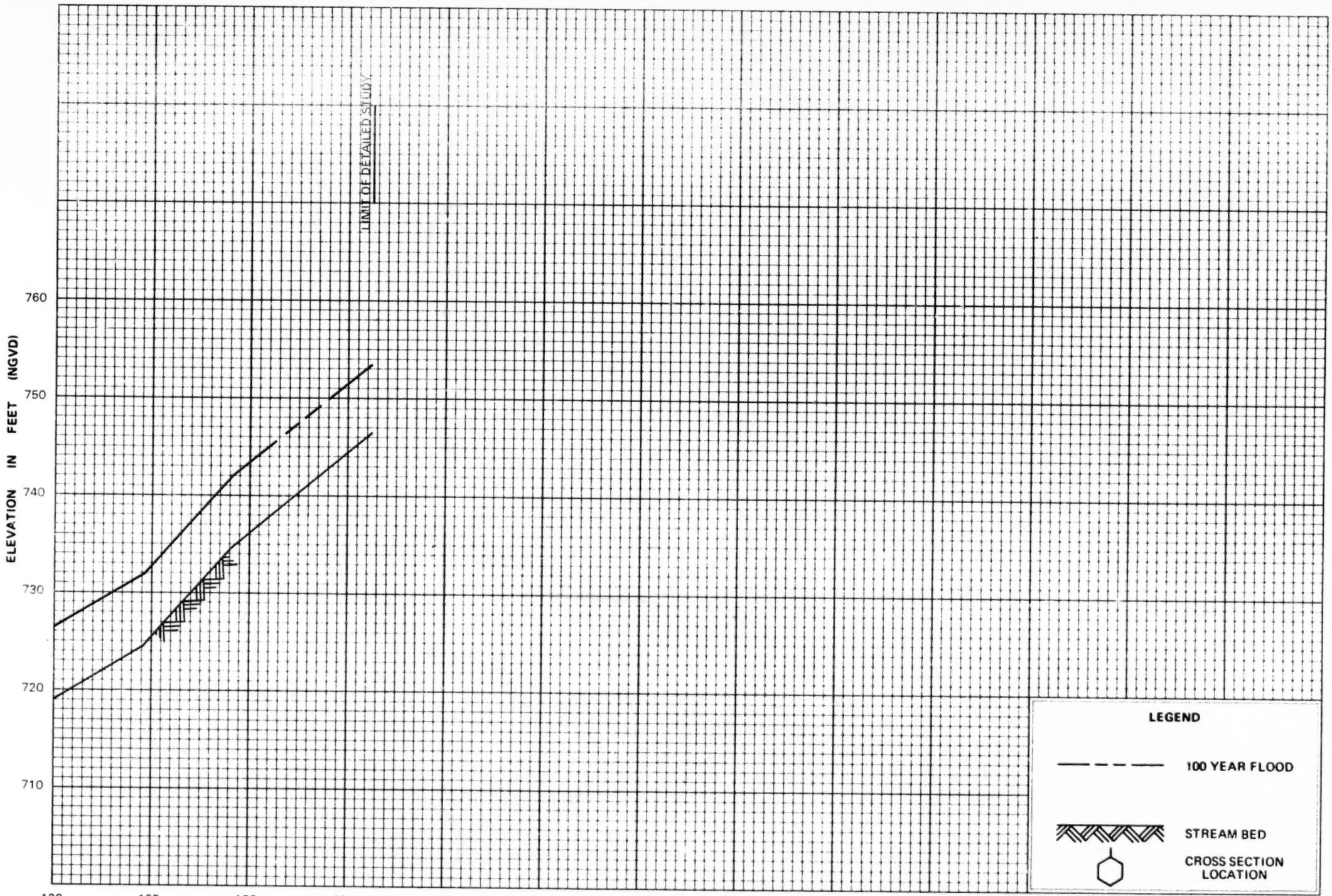
FLOOD PROFILES

LAUREL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA
(UNION CO.)

15P



FLOOD PROFILES

LAUREL RUN

FEDERAL EMERGENCY MANAGEMENT AGENCY

TOWNSHIP OF HARTLEY, PA

(UNION CO.)

16P